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Intellectual Property Department
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McLean, VA 22102

EXAMINER

MAHMOUDI, HASSAN

ART UNIT	PAPER NUMBER
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2175

DATE MAILED: 01/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/727,096

Applicant(s)

MONTGOMERY, DENNIS L.

Examiner

Tony Mahmoudi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21, 29 and 39-46 is/are rejected.
- 7) ☒ Claim(s) 22-28 and 30-38 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because of the following informalities:

Abstract contains more than 150 words. Correction is required.

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 42-45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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5. Claims 42 and 43 recite the limitation “the search engine” in line 1,
There is insufficient antecedent basis for these limitations in the claim.

6. Claims 44 and 45 are rejected under 35 U.S.C. 112, second paragraph, as being
dependent from rejected dependent claim 43.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form
the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

8. Claims 1-3, 6-7, 16-18, 20-21, 29, and 39-46 are rejected under 35 U.S.C. 102(e) as
being anticipated over Johns (U.S. patent No. 6,366,289.)

As to claim 1, Johns teaches a method of operating upon digital data (see
Abstract) comprising the steps of:
partitioning the digital data into a plurality of blocks (see column 2, lines 53-66);
creating a plurality of first threads, such that each first thread includes at least one
of the plurality of blocks (see figure 7, and see column 5, lines 58-67, where
“plurality of threads” is read on “subregions called chunks”); and

operating upon each of the plurality of first threads to obtain a plurality of compressed first threads (see column 6, lines 3-6), each compressed first thread including at least one compressed block of digital data (see column 7, lines 62-66, and see column 16, lines 8-13.)

As to claim 2, Johns teaches wherein the step of operating upon each of the first threads performs lossless compression (see column 20, lines 46-54.)

As to claim 3, Johns teaches wherein the step of operating upon each of the first threads independently operates upon each of the plurality of first threads (see column 18, lines 52-57, and see column 21, lines 52-54.)

As to claim 6, Johns teaches the method further comprising the step of combining the plurality of compressed first threads to obtain digitally compressed data (see figure 6, and see column 14, lines 52-55, where “combining the plurality of compressed first threads” is read on “compressed chunks are linked together in a linked list format”.)

As to claim 7, Johns teaches wherein the step of creating the plurality of first threads includes the step of associating each of the plurality of blocks of digital data with one of the plurality of first threads such that blocks within each of the plurality of first threads share certain common compression characteristics (see column 7, lines 62-66.)

As to claim 16, Johns teaches wherein the step of partitioning data includes the step of determining a size of each of the plurality of blocks taking data type of each block into account (see column 10, lines 45-59.)

As to claim 17, Johns teaches the method further including the steps of:

operating upon each of the compressed first threads to eliminate each of the compressed first threads and retain the compressed first blocks (see column 2, line 66 through column 3, line 3, where “eliminate” is read on “freeing up memory”);

creating a plurality of second threads, such that each second thread includes at least one of the plurality of compressed first blocks (see figure 7, and see column 5, lines 58-67, where “plurality of threads” is read on “subregions called chunks”); and

operating upon each of the plurality of second threads to obtain a plurality of compressed second threads (see column 6, lines 3-6), each compressed second thread including at least one compressed second block of digital data (see column 7, lines 62-66, and see column 16, lines 8-13.)

As to claim 18, Johns teaches wherein the step of operating upon each of the second threads independently operates upon each of the plurality of second threads (see column 18, lines 52-57, and see column 21, lines 52-54.)

As to claim 20, Johns teaches wherein, during the step of operating upon each of the plurality of second threads, the same compression algorithm used to operate upon each block is also used to operate upon the corresponding compressed block (see Johns, column 17, lines 45-51, where using "variety of compression methods" is taught. It is inherent that the same compression algorithm can be used to operate upon each block.)

As to claim 21, Johns teaches the method further comprising the step of combining the plurality of compressed second threads to obtain digitally compressed data (see figure 6, and see column 14, lines 52-55, where "combining the plurality of compressed first threads" is read on "compressed chunks are linked together in a linked list format".)

As to claim 29, Johns teaches wherein each first thread has an associated first metadata set (see column 6, lines 1-6.)

As to claim 39, Johns teaches a method of operating upon digital data (see column 4, lines 58-63) comprising the steps of:

compressing the digital data using multiple passes of a predetermined compression algorithm to obtain compressed digital data (see column 5, lines 45-47);
and

decompressing the compressed digital data using a single pass of a corresponding decompression algorithm to obtain the digital data (see column 5, lines 47-48.)

As to claim 40, Johns teaches an apparatus for operating upon digital data (see column 4, lines 58-63) comprising the steps of:

means for compressing the digital data using multiple passes of a predetermined compression algorithm to obtain compressed digital data (see column 5, lines 45-47);
and

means for decompressing the compressed digital data using a single pass of a corresponding decompression algorithm to obtain the digital data (see column 5, lines 47-48.)

As to claim 41, Johns teaches wherein the means for compressing (see column 5, lines 45-47) includes:

an interface controller (see column 2, lines 64-66, where “an interface controller” is read on “a virtual frame buffer controller”); and

a compression engine (see column 21, lines 36-38.)

As to claim 42, Johns teaches wherein the search engine comprises a single central processing unit (see column 4, lines 31-36.)

As to claim 43, Johns teaches wherein the search engine comprises a plurality of central processing units (see column 4, lines 20-25.)

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As to claim 44, Johns teaches wherein each of the plurality of central processing units operate upon different threads (see column 4, lines 20-25, where it is inherent that “other computer system configurations” operate upon different threads.)

As to claim 45, Johns teaches wherein the plurality of central processing units comprise a plurality of digital signal processors (see column 9, lines 52-61.)

As to claim 46, Johns teaches a method of allowing a plurality of compression systems to operate more efficiently (see Abstract) comprising the steps of:

obtaining metadata representative of patterns in first digital data obtained from the compression of the first digital data in a first compression system (see column 6, lines 1-6); and

distributing the metadata to the at least a second compression system so that the second compression system can use the metadata to compress second digital data which the second compression system needs to compress (see column 6, lines 29-35.)

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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10. Claims 4-5, 11-13, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johns (U.S. patent No. 6,366,289) in view of Simms (U.S. Patent No. 5,586,280.)

As to claim 4, Johns does not teach wherein at least certain ones of the first threads are independently operated upon in parallel.

Simms teaches a method for appending data to compressed records (see Abstract), in which he teaches wherein at least certain ones of the first threads are independently operated upon in parallel (see column 17, lines 16-20, and see column 19, lines 27-33.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Johns to include at least certain ones of the first threads are independently operated upon in parallel.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Johns by the teachings of Simms, because having at least certain ones of the first threads are independently operated upon in parallel, would improve the system performance, resulting in a more efficient compression of the data in a reduced time period than a single compression process.

As to claim 5, Johns as modified teaches wherein, during the step of operating, at least two different compression algorithms are used to independently operate upon different first threads (see Johns, column 17, lines 45-51, and see Simms, column 2, lines 5-12, and lines 50-56, column 4, lines 29-55, and see column 5, lines 49-59.)

As to claim 11, Johns does not teach wherein the step of creating each of the plurality of first threads uses a data type of each of the plurality of blocks so that each of the first threads contains blocks which have a similar data type.

Simms teaches the step of creating each of the plurality of first threads uses a data type of each of the plurality of blocks so that each of the first threads contains blocks which have a similar data type (see column 7, lines 11-16.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Johns to include the step of creating each of the plurality of first threads uses a data type of each of the plurality of blocks so that each of the first threads contains blocks which have a similar data type.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Johns by the teaching of Simms, because having the step of creating each of the plurality of first threads uses a data type of each of the plurality of blocks so that each of the first threads contains blocks which have a similar data type, would enable the system to categorize data into blocks of data with common characteristics amongst the data items.

As to claim 12, Johns as modified teaches wherein the data type is determined according to header information related to each block (see Simms, column 3, lines 7-14.)

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As to claim 13, Johns as modified teaches where the data type is determined by comparing the block data to various predetermined data patterns (see Simms, column 20, lines 8-24.)

As to claim 19, Johns does not teach wherein at least certain ones of the second threads are independently operated upon in parallel.

Simms teaches a method for appending data to compressed records (see Abstract), in which he teaches wherein at least certain ones of the second threads are independently operated upon in parallel (see column 17, lines 16-20, and see column 19, lines 27-33.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Johns to include at least certain ones of the second threads are independently operated upon in parallel.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Johns by the teachings of Simms, because having at least certain ones of the second threads are independently operated upon in parallel, would improve the system performance, resulting in a more efficient compression of the data in a reduced time period than a single compression process.

11. Claims 8-10 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johns (U.S. patent No. 6,366,289) in view of Morikawa et al (U.S. Patent No. 6,043,897.)

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As to claims 8 and 14, Johns does not teach the method further including the step of predicting an estimated compression time and estimated compression amount for each block.

Morikawa et al teaches an image forming apparatus (see Abstract), in which he teaches the step of predicting an estimated compression time (see column 2, lines 14-18) and estimated compression amount for each block (see column 5, lines 57-63.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Johns to include the step of predicting an estimated compression time and estimated compression amount for each block.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Johns by the teaching of Morikawa et al, because including the step of predicting an estimated compression time and estimated compression amount for each block would enable the system to provide the user with information associated with compression of each block of data, as to how long the compression would take and how large the size of the compressed data would be after performing the operation on the block of data.

As to claims 9 and 15, Johns as modified teaches wherein the step of creating the plurality of first threads also uses estimated compression time and estimated compression amount to determine which blocks should be associated with the same first thread (see Morikawa et al, column 2, lines 4-18.)

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As to claim 10, Johns as modified teaches wherein the estimated compression time and estimated compression amount are made based upon a selected compression algorithm, and wherein the step of predicting includes the step of determining whether a proposed estimated completion time that is based upon one of the compression algorithms available for selection will allow for a desired compression amount to be achieved within a desired compression time for the digital data (see Morikawa et al, column 2, lines 7-17.)

Allowable Subject Matter

12. Claims 22-28, and 30-38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
13. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record, Johns (U.S. Patent No. 6,366,289), Simms (U.S. Patent No. 5,586,280), and Morikawa et al (U.S. Patent No. 6,043,897), do not disclose, teach, or suggest the claimed limitations of (in combination with all other features in the claim):

wherein the step of creating the plurality of second threads includes the step of associating each of the plurality of compressed first blocks with one of the plurality of second threads such that compressed first blocks within each of the plurality of second threads share certain common compression characteristics, as claimed in claim 22.

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Claims 23-25 are objected to as being dependent from the objected to dependent claim 22.

The prior art of record, Johns (U.S. Patent No. 6,366,289), Simms (U.S. Patent No. 5,586,280), and Morikawa et al (U.S. Patent No. 6,043,897), do not disclose, teach, or suggest the claimed limitations of (in combination with all other features in the claim):

wherein the step of operating upon each of the plurality of first threads also results in obtaining a plurality of first metadata sets, each first metadata set including portions of compressed first blocks which are determined to possibly have redundancies disposed therein, as claimed in claim 26.

Claims 27-28 and 30-38 are objected to as being dependent from the objected to dependent claim 26.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of art with respect to data compression and decompression, and database partitioning in general:

U.S. Patent No. 5,870,087 to Chau.

U.S. Patent No. 5,892,966 to Petrick et al.

U.S. Patent No. 6,374,266 to Shnelvar.

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15. Any inquiries concerning this communication or earlier communications from the examiner should be directed to Tony Mahmoudi whose telephone number is (703) 305-4887. The examiner can normally be reached on Mondays-Fridays from 08:00 am to 04:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici, can be reached at (703) 305-3830.

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December 26, 2002



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